

## Claims

1. A process for manufacturing a particulate titanium dioxide product, wherein hydrated titanium dioxide is precipitated from an aqueous solution of titanium oxychloride by adding to the solution titanium dioxide particles as crystal nuclei and the product obtained from the precipitation step is isolated and optionally calcined,  
5 **characterized** in that the crystal nuclei are added to an aqueous solution of titanium oxychloride having a content of  $>90$  g  $\text{TiO}_2$ /l calculated as  $\text{TiO}_2$ , and that the precipitation is carried out at a temperature below the boiling point of the said aqueous solution and at normal pressure.
- 10 2. The process according to claim 1, **characterized** in that the content of the aqueous solution of titanium oxychloride is 95–300, preferably 100–250, for example 150–230, g of  $\text{TiO}_2$  in one litre of solution.
3. The process according to 1 or 2, **characterized** in that the titanium dioxide particles are added at 0,5–10% by weight, 1–7% by weight, preferably 1,5–5% by  
15 weight, more preferably 2–5% by weight, calculated on the basis of the total titanium content in the solution of titanium oxychloride and expressed as  $\text{TiO}_2$ .
4. The process according to any of the previous claims, **characterized** in that the titanium dioxide particles are added as a suspension, preferably as an aqueous suspension, and the content of suspension with respect of  $\text{TiO}_2$  is 5–100 g/l,  
20 10–80g/l, preferably 10–50 g/l.
5. The process according to any of the previous claims, **characterized** in that the average particle size of titanium dioxide particles to be added is 1–15 nm, preferably 5–15 nm.
6. The process according to any of the previous claims, **characterized** in that  
25 the titanium dioxide particles to be added are of the rutile and/or anatase crystal form, preferably more than 20% in rutile.
7. The process according to any of the previous claims, **characterized** in that the precipitation step is carried out at a temperature, which is between 50–100°C, preferably between 60°C and below 100°C, more preferably between 70–98°C.
- 30 8. The process according to any of the previous claims, **characterized** in that following the separation the precipitated titanium dioxide product is washed and

neutralized with a base to a pH range of 6-10, more preferably to a pH range of 7-9.

9. The process according to any of the previous claims, **characterized** in that the calcination is performed at a temperature below 700°C, preferably at 100-500°C more preferably at 150-400°C.

10. The process according to any of the previous claims, **characterized** in that by using the process a titanium dioxide product with crystals having an average diameter of less than 50 nm, preferably 5-30 nm, still most preferably 5-20 nm, is prepared.

10 11. The process according to any of the previous claims, **characterized** in that a titanium dioxide product with specific surface of 10-500 m<sup>2</sup>/g, most preferably 10-300 g/m<sup>2</sup>, is prepared by using the process.

12. The process according to any of the previous claims, **characterized** in that titanium dioxide, having a crystal form of predominantly rutile, preferably more than 70%, more preferably more than 80%, still more preferably more than 90%, in rutile.

13. The process according to any of the previous claims, **characterized** in that into the aqueous solution of the titanium oxychloride to be precipitated there is added an amount of sulphate, which is 1-5% by weight calculated on the basis of the amount of TiO<sub>2</sub> in the solution, which sulphate is preferably in the form of an acid or a salt.

14. The process according to any of the previous claims for the production of a photocatalytically active titanium dioxide product.

15. A process according to claim 14, **characterized** in that a titanium dioxide product is prepared, having activity in the UV region of light.

16. A process according to claim 15, **characterized** in that a titanium dioxide product is prepared, having activity in the visible region of light.

17. A titanium dioxide product, preferably a photocatalytically active titanium dioxide product, which is obtainable by a process according to any of the previous claims 1-16.

18. The use of a titanium dioxide product prepared by a process according to any of the previous claims 1–16 or a titanium dioxide product of claim 17 as a photocatalyst, preferably a photocatalyst within the UV region and the visible region of light.
- 5 19. The use according to claim 18 for the cleaning of indoor air.
20. The use according to claim 19 in self-cleaning surfaces.
21. A photocatalyst, which comprises a titanium dioxide product prepared by a process according to any of the previous claims 1–16 or a titanium dioxide product of claim 17.
- 10 22. A product, which has a surface coated at least in part with a photocatalyst coating, which comprises a titanium dioxide product prepared by a process according to any of the previous claims 1–16 or a titanium dioxide product of claim 17.